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ASSUMPTIONS MADE BY THE CANADIAN GOVERNMENT IN ESTABLISHING STRATEGIES FOR ENVIRONMENTAL QUALITY IMPROVEMENT

BY
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The Atlantic Council of the United States Conference
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"Goals and Strategies for Environmental
Quality Improvement in the Seventies"

January 15 -17, 1971



General publication
LG-1

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* The views expressed herein are those of the author and
are not necessarily those of the Government of Canada.

The subject of environmental quality today is so broad and carries so many different connotations that one is almost forced to begin any paper on the subject by setting one's boundaries. I have decided to focus mainly on the quality of our natural environment, of our water and, to a lesser extent, our air resources. I shall also mention some recent actions designed to protect the quality of our northern land resources. I will not discuss matters related to land use and visual pollution or to congestion, blight and sprawl in our urban areas. What I say about assumptions underlying strategies for water and air quality applies, of course, to both urban and non-urban areas.

This choice reflects the priorities that the Government of Canada has been pursuing over the past few years. This has been due partly to constitutional factors. Urban problems have been viewed as essentially provincial responsibilities. Recent events which I will mention indicate, however, that the Canadian Government intends to give more emphasis to urban problems in the future.

This choice also reflects my own background. I hope it is what the Atlantic Council had in mind when it requested this paper.

The title itself, as suggested by the Atlantic Council, reflects several interesting assumptions that deserve comment. It assumes that the Government of Canada has strategies for environmental

quality improvement. This is certainly true and I shall attempt to identify and to describe them. It assumes that the government is concerned not only with preventive measures designed to maintain environmental quality but also with curative measures designed to improve it. This is true also. It may, however, be rather optimistic to assume that immediate strategies emphasize improvement. The immediate task is to ensure that environmental quality does not deteriorate further.

A rather important assumption implied in the title is that the Government of Canada has the primary responsibility for environmental quality. It does have a significant, perhaps a major role to play. It must be recognized, however, that Canada is a federal state and jurisdiction over environmental quality is divided in a most complex fashion between the federal and provincial governments. Strategies applied by the federal government, therefore, very often cannot succeed without comparable or at least supportive or joint action by the provinces. And vice versa.

Furthermore, the transcendent character of water and air resources and the phenomenon of trans-boundary spillovers mean that many aspects of environmental quality are international in character. These aspects, which are growing in number and scale, are not fully amenable to strategies applied by any single nation state. They will require the support of many nations, often the entire world community, acting in concert under informal arrangements as well as under formal understandings, treaties and conventions. The work of organizations

like the Atlantic Council is vital to encourage necessary action at this level. It can also serve to ensure that international environmental strategies are as compatible as possible with other facets of international life such as trade and commerce, industry and finance and research and technology.

Early Concerns - The Commission of Conservation

Environmental quality is a "now" issue, both in terms of urgency and the degree of public awareness and concern. The Act to create the Department of the Environment, to which I will shortly belong, was introduced into Parliament only one month ago. The creation of this department, however, is the product of a concern that goes back a long time. Back, in fact, to the beginning of this century, to the period when Canada was discovering for the first time the need for conservation.

In 1909 the government of Sir Wilfred Laurier, on the initiative of Sir Clifford Sifton, Minister of the Interior, established the Canadian Commission of Conservation. Its existence and work owed much to the conservation movement of the United States, which had enjoyed the dramatic leadership of President Theodore Roosevelt. The Commission played a vital role in the development and articulation² of the conservation ethic in Canada. It pursued its work until 1921 but, following its demise, the conservation movement gradually petered out. It gives one pause that the degree of environmental concern represented by the Commission of Conservation could have developed

over half a century ago and then lapsed. Whatever the reasons, and there are many, the conservation movement did lapse in the early 1920's.

The Basis of Today's Concern and Strategies

Concern over environmental quality did not re-emerge as a strong force until the last few years. It is useful to speculate briefly on some of the factors underlying this resurgence. These factors, although perceived and weighed differently by different people, provide a context within which to discuss the many recent environmental initiatives by the Government of Canada.

The growing concern about environmental quality is explained in part, I suspect, by both increased levels of education and new and more sophisticated mass communication techniques. They have combined to make words like environment, ecosystem, coliform counts and assimilative capacity a part of the language of everyday life.

The notion of a biosphere has been around for nearly a century. It is only in the last ten years at the most, however, that the public mind has become aware that the thin global envelope of water, air and soil upon which all life depends is not an inexhaustible reservoir, but rather a finite, closed and interdependent system with a limited capacity to assimilate the waste residuals of man's activity. It has become aware, too, that environmental overloading has contaminated and even destroyed parts of this system and that an indefinite growth in the volume and variety of waste loading could threaten the entire system. The educated public mind of today not only understands this but also is quite capable of deducing some of its implications. Moreover,

having attained a degree of material comfort and affluence, it can afford to be more involved in issues of quality.

In my view, the depth of today's concern stems mainly from the enormous and accelerating demographic, economic and technological growth that we have experienced and that we are projecting into the future on a global and continental, as well as a national basis. This also helps to explain why we are now, more and more frequently than in the past, coming up against the constraints imposed by a finite biosystem.

Compare, for convenience, the Canada of 1921 just after the demise of the Commission of Conservation with that of 1966, when public concern was once again becoming significant. In 1921 the total population of Canada was just over 9 million; by 1966 it was over 20 million. In 1921 less than half the population was classed as urban; by 1966 the proportion was virtually three-quarters. In 1921, the majority of those who did not live in towns were farmers. By 1966 less than one Canadian in ten lived on a farm and the proportion was falling rapidly.

The year 1966 is not a terminal point, of course; it is merely a convenient point of reference to mark the progress of changes that seem likely to continue for several decades. It seems inevitable, for instance, that the Canadian population will continue to grow, at least during the remainder of the century. Medium projections suggest that the 1981 population of Canada will be over 25 million, and that the 2000 population will approach 34 million. High projections indicate

that it could reach over 40 million by the turn of the century.

Viewed in the context of the world population explosion, or even when compared with similar U.S. projections, such a rise is extremely modest. Three aspects of this population change, however, are of major importance for Canadian environmental management. In each of them Canada experiences problems that are either unique or unusual in comparison with other industrialized countries. I refer to the rapid rate and concentration of urban growth; the location of most of our population along a narrow strip adjacent to the United States border; and the anticipated rapid growth in our labour force.

It is not sufficiently recognized, even in Canada itself, that Canada is now one of the most highly urbanized countries in the world. It is likely to become even more so in the future. Definitions of "urban" and "rural" differ from one country to another, but if we look only at changes over time this does not matter. I remarked earlier that 73 per cent of the Canadian population was urban in 1966. By 1981 this proportion is projected to rise to 85 per cent and by 2000 to 94 per cent. By that time, nine out of ten Canadians in Quebec, Ontario, Manitoba, Alberta and British Columbia are expected to be living in towns or cities. Only in Prince Edward Island is the proportion likely to be below eight in ten.

Perhaps even more dramatic, the majority of the Canadian population is tending to concentrate in a relatively small number of large urban units. In 1966 the nine largest cities accommodated 40 per cent of the population; by the end of the century, they could include over 50 percent. By that date, more than one Canadian in three is

likely to be living in Montreal, Toronto or Vancouver. These cities could more than double and, perhaps, nearly triple in three decades.

During this short period Canadians will have to plan and construct more urban area than they have in their entire history. This represents a great opportunity to remold our cities so that they are well designed functional units, instead of the products of haphazard sprawl; so that urban living is attractive socially and environmentally as well as economically. In the absence of effective environmental management strategies, however, such urban growth could also bring about an enormous increase in urban water, air, soil, and noise pollution, not to mention solid wastes.

Our larger cities are and will continue to be located along a very narrow strip adjacent to the U.S. border. Moreover, most of our population is and will continue to be concentrated mainly in two areas: the Great Lakes-St. Lawrence Basin and the Lower Fraser Valley. In these two areas, we share common water, air and, when you consider recreation, even land resources, with the United States.

Projections indicate that within 30 years more than half the population of Canada - some 16 million people - will be resident in 21 centres stretching along the St. Lawrence lowlands from Windsor to Quebec City. At the same time, according to the U.S. Department of Housing and Urban Development, U.S. cities around the Great Lakes may experience a combined increase of 18.7 million, from 40.4 million to 59.0 million.⁴ In the Lower Fraser, while Vancouver doubles or triples in size to between 1.6 and 2.0 million, the population of the nearby Seattle-Tacoma-Portland complex could increase by 2.4 million.⁵ If we

consider the combined projected population of these two areas within the context of increased production and consumption per capita, increased leisure time, an exploding technology and other trends, it is obvious that, barring effective management strategies, the pressures on their natural environment could become enormous.

The anticipated changes in our labour force are also an important consideration in developing environmental management strategies. Canada shares with the United States and other countries the problems of adjustment to the post-industrial age. She has other problems, including the massive decline in primary resource employment. This has a long way to go in many parts of the country. More immediately important than either of these, however, is the basic consequence of the present youthful population - the need to absorb a rapid growth in the labour force during the next decade. The position has been dramatically summarized in a study published by the Economic Council of Canada. Between 1965 to 1980 more people, in absolute as well as relative terms, will be added to the labour force in Canada than will be added to the labour forces of Great Britain, West Germany and Italy combined. Those countries had in 1965 a population of about 165 million; in Canada it was under 20 million.

Given these projections there is very little argument in Canada about the need to maintain a high rate of economic growth. And studies indicate that we can do so. Recent projections suggest, for example, that real gross national product per capita could increase by two and one half times by the end of the century.

This projection superimposed on the population and other projections, summarizes the environmental management problem; and, for many, it is a dilemma. The increased affluence of a much larger population

will produce much more waste and could result in much more pollution. This is because man really consumes very little. He, and his economic machine, take material in, at most transform it, and then pass it on. Because of the physical law that matter can be neither created nor destroyed, all material and energy is eventually ejected back into the environment. The rate and form in which it is ejected back into the environment must not exceed the assimilative capacity of that environment or we will experience a progressive deterioration in the quality of that environment.

The apparent conflict between growth and quality is heightened by the fact that projections of economic growth by industrial sector show very high growth rates in those industries that are now pollution-intensive; for example, utilities, manufacturing, transportation, construction, mining, agriculture and forestry. Effective environmental management strategies in the future must therefore reconcile continuing economic growth with a progressively improving level of environmental quality. Our sad inability to achieve this in the past, and the legacy which that failure has left, make it obvious that such reconciliation will not be easy. Some, indeed, have already concluded that it is impossible: because the assimilative capacity of the biosphere is finite and is already strained, they argue that the only answer is somehow to halt growth.

I am not ready to accept this position and I am sure that the Canadian Government does not accept it: it is not one of the assumptions underlying its strategies.

In my view there are several reasons for not accepting this position. Let me mention two. First, as the Economic Council of Canada

declared in a recent report, the benefits of growth can provide the means to finance the strategies required to enhance environmental quality.⁸ This assumes of course, that a greater proportion of the nation's product will be allocated to environmental measures. This assumption holds regardless of whether the expenditures are financed through the public or private sector.

Second, research and technology. It is true that the rather indiscriminate application of an almost exclusively market-oriented research and technology has been the underlying source of most environmental problems. Research and technology, however, could also be the main source of solutions to these problems. They could be applied to developing new, environmentally acceptable methods of power generation, of transportation, of mining and manufacturing, of food production. Much of this may have to be financed by or through the public sector if social goals are to be achieved. But there would appear to be many reasons why the private sector can and should carry a great deal of this work. The private sector, for one thing, has the largest and fastest growing capability for research and development. This capability is highly concentrated; a 1967 Canadian study indicated that 83 per cent of all industrial research and development expenditures were made in seven industries.⁹ All of them are presently pollution-intensive: transportation, electrical, chemical, petroleum, pulp and paper and metal and construction. Similar ratios were found in nine other industrial nations studied. These industries have the demonstrated capability to innovate, manufacture and market pollution-intensive products employing pollution-intensive processes; they should therefore have the capability to

innovate, manufacture and market new environmentally acceptable products employing environmentally acceptable processes. Effective environment management strategies in the future would seek to guide private research and technology in this direction.

A moment ago I suggested that there were a number of areas in which environmental strategies could be fully effective only if they had the support of many nations acting in concert. This, it seems to me, is one such area. The study I just referred to also revealed that most private research and development expenditures tended to be concentrated in a small number of large companies, mainly multi-national. Other studies have revealed that this is the most dynamic sector of the world economy. If it continues to be so, then international corporations will continue to be the source of an increasing volume and variety of products and services. With their vast research and technological capability, they could become a major source of technology to resolve environmental problems as well as a most effective vehicle to apply and market that technology on a worldwide basis. It seems reasonable, therefore, that governments should take this capability into account when formulating environmental policies.

The Range of Possible Strategies

Even a brief discussion of some of the dimensions of the problem reveals that in the future, environmental management will require the application of a broad range of strategies. Implicit in the assigned title of this paper is the notion that these strategies should have as their common goal the improvement of the quality of the environment. As I have just said, I take this to include continued economic growth

at a rate and of a kind compatible with improved environmental quality.

Public strategies may seek to achieve this goal basically in three different ways, singly or in combination. They may attempt to control the volume and quality of waste residuals discharged into the environment by any given activity. These strategies are often focused on the point of emission. Precipitators for stack gases, after-burners for internal combustion engines, or primary, secondary or tertiary treatment facilities for liquid emissions are examples of technical devices often employed. Alternatively, strategies may attempt to control the location of the activity giving rise to the waste or the location of those affected by the waste, or both. Examples of this type employed in Canada range from separating airports and residential areas to installing ladders or chutes to take fish around a dam. A third type of strategy would seek to modify or eliminate the activity or substance giving rise to the waste residual. This type of strategy is normally focused on the point of design or production. It could include the financing of research on a new mobile power plant or, as we have recently attempted in Canada, a reduction in the use of mercury and high sulphur fuels or the progressive elimination of phosphates in detergents.

These strategies may be designed to prevent a further deterioration of quality in a given area or to cure an existing situation. They may take a wide variety of forms. In Canada, new legislation which I will discuss in a moment enable a broad range of planning, regulatory, financial and other strategies, as well as expanded research and information systems. Some of these strategies rely on incentives: grants, loans, tax credits and effluent charges, for example. Others rely on punitive measures, and others on a combination of both. This

reflects, I think, the readiness of the government to employ whatever strategies appear most effective in any given situation.

Finally, I would like to observe that these strategies may be applied in a variety of jurisdictional situations. In Canada, with our federal constitution, and with our cities and other municipalities being legal creatures of the provinces, we are concerned with basically three situations. The first involves pollution within a province which has its source and effects both contained within the province. The second involves pollution which is interprovincial and the third involves pollution which is international either in its sources and effects.

The distribution of rights and responsibilities for environmental management under our constitution is extremely complex. Both the federal and provincial governments have significant responsibilities in each of the three jurisdictional situations mentioned. The federal government's legislative jurisdiction is considered dominant in the case of international, boundary and coastal waters and some authorities maintain that the federal government has a "major" jurisdiction over interprovincial waters. It does have exclusive legislative jurisdiction over navigation and fisheries and concurrent jurisdiction over agriculture. The situation respecting air is not nearly so clear. Exclusive federal powers respecting the criminal law and trade and commerce are also significant in the field of environmental management, as are its unrestricted tax and spending powers.

The provinces, on the other hand, enjoy proprietary rights over land and other natural resources within their boundaries. This, coupled with other powers, gives them the right to allocate the

resources and to regulate their use. They may also legislate on most aspects of pollution control.

The corollary of this for Canadian environmental management strategies is federal-provincial co-operation and often joint action. It is mandatory for the application of some strategies and desirable for most.

Assumptions Underlying Federal Strategies

The mix of functions and activities, of incentives and punitive measures represented by any strategy may reflect a variety of assumptions. So may the vigour with which any strategy is pursued by different ministers or different governments. Even under the most stable conditions, then, it would be difficult to discuss assumptions underlying federal environmental strategies.

The field of environmental management in Canada today is in a state of rapid development. The parliamentary year ending last June saw a flood of new initiatives and six major pieces of legislation providing the basis for new strategies in the field of water quality management. This year has so far seen more important initiatives and two major pieces of legislation, including one establishing the new Department of the Environment. Further legislation has been announced, including our first national air quality act. The constitutional framework for environmental management has been reviewed and proposals for constitutional amendment may be laid before the Federal-Provincial Prime Ministers' Conference next month.

Since only some of this legislation has yet been applied, and then only in part, the following discussion of underlying assumptions

must necessarily be deductive and tentative. The source material is mainly the legislation itself, ministerial statements, evolving national and international programs and my own experience as an involved, public servant. The deductions and opinions, of course, are mine.

Department of the Environment

Let me begin this discussion of underlying assumptions by referring to the most recent and, perhaps, most important change, the establishment of the Department of the Environment. This change brings together in a single ministry those federal agencies responsible for the management of our water resources, inland and marine, and for our air resources. In addition to the Minister's mandate relating to "the protection and enhancement of the quality of the natural environment, including water, air and soil quality", he also has direct responsibility for those agencies concerned with the management of fisheries, forestry and wildlife. Since he is also responsible for water resources, the Minister of the Environment will have the major federal responsibility for the management of renewable resources.

In establishing a department of the (natural) environment, the government is accepting the need for an integrated approach in the development and application of environmental quality strategies. It has recognized, I think, the strong interrelationships between water, air and soil pollution. It has also recognized the possibility for trade-offs and for shifting the burden of pollution from one resource to the other unless environmental quality strategies in each area

reflect certain common assumptions.

Perhaps just as important, the establishment of the Department may reflect a determination that all government programs concerned with economic development and related matters should reflect environmental considerations. It seems clear from recent statements that this is intended to be a major Cabinet post able to ensure that economic growth and development is balanced with concern for environmental protection.^{9a}

This could be read into the October 8, 1970 Throne Speech announcing the department. After mentioning forthcoming legislation to control oceanic and air pollution, the Governor-General went on:

"More pressing than any single step or steps, however, is the need to co-ordinate and consolidate our efforts in an effective fashion. There will be proposed the establishment of a department to be concerned with the environment and the husbanding of those renewable resources that are part of and dependent on it, with a mandate for the protection of the biosphere."¹⁰

It is also reflected in statements over the past year by the Prime Minister. Speaking in the debate on the Throne Speech last October, he indicated that the new department was intended "to bring under the direction of a single minister the principal government activities relating to environmental quality in general, and pollution in particular."¹¹

The establishment of the Department of the Environment may be viewed as a benchmark in a logical progression of events dating back at least to 1966. In January of that year the Government brought together a number of agencies responsible for water management in the Department of Energy, Mines and Resources. The Minister of Energy, Mines and Resources was made responsible for "co-ordinating, promoting and

recommending programs with respect to energy, mines and minerals, water
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and other resources."

To achieve this, the Minister in January, 1967 established a "Water and Renewable Resources Sector". This Sector in turn established new formal and informal vehicles for policy development and co-ordination within the government and with the provinces and university community. It is fair to assert, I think, that the Water and Renewable Resources Sector was responsible for the conceptual foundation of much of the legislation that has been adopted in the past year.

When the Department of Energy, Mines and Resources was established it was recognized that it was only a first stage toward the integration of policies and programs for the natural environment. It was felt necessary, however, to establish some order of priorities, and the government of the day decided that the management of water resources should be tackled first with air and, perhaps, soil to follow.

The Canada Water Act

I mentioned a moment ago that six major pieces of water management legislation were enacted during the last parliamentary year. The names of these Acts convey an idea of the breadth of their coverage: the Canada Water Act, the Arctic Waters Pollution Prevention Act, the Northern Inland Waters Act, An Act to Amend the Fisheries Act, An Act to Amend the Canada Shipping Act.

The Canada Water Act is in many ways the most important of these Acts. It provides a framework for most of the strategies that the government may wish to employ to enhance the quality of the environment.

Furthermore, many of its key underlying assumptions are common to the other Acts. Since it is concerned with the inland waters of southern Canada, it is also the Act which will have the most direct impact on the daily lives and activities of the population.

In discussing the Canada Water Act, it is important to stress that it is not solely a water quality control act. It is first and foremost an Act to provide for the comprehensive planning and management of the water resources of Canada. It provides the institutional and other means for comprehensive planning and management in regions of national interest. In addition, it provides for a wide range of information systems concerning the quantity, quality, distribution and use of water. It also provides for the conduct of research on any aspect of water.

The Act should result in more decisions being based upon an examination of sociological, economic and ecological factors rather than solely upon technical feasibility; on more decisions being based on an attempt to maximize the stream of net benefits from all uses, ecological and esthetic as well as economic. This will not be easy but it will have to be achieved if the key assumption implicit in the Act is to be realized: that assumption is that the fundamental goal of comprehensive water resource planning and management should be to improve regional and national welfare.

The Canada Water Act rests firmly on the comprehensive approach. In Canada, because jurisdiction over inland water resources is divided between federal and provincial governments, a comprehensive

approach is necessarily a federal-provincial approach. Hence, a corollary assumption of the Act is federal-provincial co-operation.

The Act enables the initiative in respect of any water program to originate at either the federal or provincial level and it provides for joint effort from the conceptual stage through to implementation. It also provides for complete flexibility in the selection of mutually acceptable federal-provincial administrative instruments for consultation, planning, and implementation. These may be established on a national, provincial, regional, or river-basin basis. Many have already been established.

Ministers have stressed repeatedly that the federal government intends to co-operate fully with provincial administrations in the
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implementation of the Act. In the event that a province is unwilling to co-operate, however, in a region of "national interest", or if co-operation breaks down, the Act provides that the federal government may proceed unilaterally.

Although water quality control is not the primary purpose of the Canada Water Act, it is the most pressing problem in many areas. The Act does, therefore, make special provisions for water quality management. The process of water quality management, as set out recently
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by the Minister of Energy, Mines and Resources, will be as follows:

First, each major water body will be designated on a sequential basis, so that the most serious pollution problems will be tackled first. This will be done jointly, in consultation with the provinces. Second, agreements will be negotiated, establishing joint Water Quality Management Agencies for each designated area or collection of areas. Third,

the provincial and federal governments will establish guidelines and procedures to be used by the agencies in arriving at water quality objectives, quality standards, effluent discharge fees, and treatment charges. Fourth, each agency will be instructed to develop and submit water quality management plans for the designated area, recommending the optimal level of water quality for a series of target dates, taking into account the full range of future uses of the water body. The same plan will project future waste treatment facilities and other measures required, and charges for the use of these facilities and measures. Fifth, the plans will be submitted to the federal and provincial governments for approval. At this point, the senior governments will ensure equity, consistency, and see that "pollution havens" are avoided by insisting on appropriate levels of quality standards and treatment. Finally, on approval of the plans by both governments, the agency would be instructed to implement them and enforce the standards contained therein.

Several critical assumptions underly the approach to water quality management enabled by the Act. I will mention three.

To begin with, in all cases, comprehensive planning will include planning for water quality management. It, too, will be comprehensive and the Act would enable virtually the entire range of strategies mentioned earlier to be included in a water quality management plan. Because of the urgency of pollution problems, the preparation and implementation of a water quality management plan by an agency may come before the preparation of an overall water management plan in certain areas.

Second, the water quality standards established by a basin may vary for different points in the basin and for different points in time. Overall, however, it will be recognized that there is an upper limit to the amount of waste that any water course, or indeed any particular stretch of a water course, can carry without endangering its ecological balance or the ecological balance of interconnected rivers, lakes or estuaries.

Now, of course, this assumption can be related to the mandate of the new Department "for the protection of the biosphere." Various strategies may reflect this assumption. Recognition of the assimilative capacity of a water body could be reflected in the water quality standards imposed by a management plan. There could be a complete prohibition placed upon the deposition of certain toxic or dangerous substances in the water course, mercury, for example, or phosphates in detergents. This would result in companies either not using the substance or, if they had to use it, recycling it completely, keeping it "within the factory fence". Alternatively, if it was felt that the emissions of certain substances into a water body, or into the environment generally, should be controlled on a national basis, they could be made the subject of overriding national standards.

The federal government could control the distribution and use of different substances with different effects under different powers; regulations governing the importation and interprovincial sale of pollution-intensive equipment or fuels, for example; regulations governing the agricultural use of fertilizers or biocides; regulations governing the use of chemicals deleterious to fish under the Fisheries Act; or regulations governing the use of substances deleterious to man under

the Criminal Code, analogous to those under our Food and Drug Act. A water quality management plan developed under the Canada Water Act does not have to rely solely on the powers contained in that Act; it can employ other federal powers. The use of other powers should be greatly facilitated by organization of the new department.

A third crucial assumption underlying the Canada Water Act is that the individual or industry that is responsible for producing a given waste should pay for its containment, treatment or disposal.^{14a}

Given the growth projections outlined early in this paper, it is evident that if we are going to live within the assimilative capacity of our water and other environments, more and more industrial waste will have to be recycled and "kept within the factory fence". In the future, therefore, industry must accept pollution abatement as a cost of production in the same way as land, labour and production equipment, and strategies should seek to ensure that pollution abatement costs are internalized to as great a degree as possible.

Recent statements of various ministers indicate that this same principle would apply to municipalities. Government programs recognize that many municipalities face a heavy burden of expenditure in order to catch up with the backlog of facilities required to treat their wastes to acceptable standards. Municipalities now receive assistance in borrowing capital for the construction of major works. In the case of new urban development, however, there would appear to be little reason to relieve municipalities generally of the full weight of environmental quality measures.

The application of this philosophy in the field of water

quality management, and its proposed extension to other areas of environmental quality management, has widespread implications. Clearly, it will have to be applied with great care and foresight. Over time, it would probably result in an increasing proportion of the nation's product being shifted to environmental protection. It will almost certainly result in increased prices for a wide range of goods and services. It could have special consequences for industries trading in an international market and these would have to be considered. Certain standards or prohibitions could have the effect of non-tariff trade barriers and these, too, would have to be considered. Indeed, in some cases, the application of the policy may have to await an understanding or agreement on the part of those nations directly concerned.

The need for foresight and close industry-government co-operation in applying this philosophy has been recognized. In recent statements various ministers have indicated, for example, that in introducing this policy a distinction would have to be drawn between existing industries and new industries. Some existing industries that are gross polluters are simply not in a financial or competitive position to carry the full costs of pollution abatement. Some may have to be closed but often this may not be feasible or socially desirable, for example, where an entire community is dependent on an industry. Assistance will therefore be necessary for some existing industries. This could take the form of direct grants or low-interest loans or accelerated tax write-offs. Personally, I would like to see the form of assistance tailored to the industry, even to the individual company, rather than an across-the-board program. In many cases perhaps nothing more would be required than an extended target date to meet the imposed standards.

The situation with regard to new industry, or new extensions to existing industry, is quite different. There may be circumstances in which an industry could justify a claim for special consideration, circumstances stemming from international market or trade factors, for example. But, generally speaking, when the program gets underway, I should think that new industry would be expected to comply fully with all environmental quality measures and treat any additional costs as costs of production.

I have spent a considerable time on the Canada Water Act because it is the most fundamental piece of environmental legislation enacted in recent years by the Government of Canada. Of primary concern to the objectives of this conference, the Act embodies a number of the more important principles and assumptions that are likely to guide future federal action in regard to environmental quality. Furthermore, these assumptions are reflected in all of the related water quality acts adopted in the last year. Let me cite two cases in point: the Canada Shipping Act and the Arctic Waters Pollution Prevention Act.

The Canada Shipping Act

The assumption that the individual or industry responsible for an activity should bear the costs of containing or treating its waste emissions is reflected strongly in the recently proposed amendments to the Canada Shipping Act. ¹⁵ They provide for the prevention and control of pollution in Canada's 12-mile territorial sea and in certain "special bodies of water" to be established as exclusive Canadian fishing zones (namely, the Gulf of St. Lawrence, the Bay of Fundy, Queen Charlotte Sound, Hecate Strait and Dixon Entrance). Among other things, this Act

would establish a Maritime Pollution Claims Fund. This fund would be financed by a tonnage levy on all oil imported into Canada, or transported between Canadian ports, by sea. Under independent administration, the fund would compensate victims of marine pollution, including federal and provincial governments. They could claim expenses incurred in cleaning up oil spills in those cases where the owner of the ship, or of the pollutant, cannot be identified. Where the owner of the ship or cargo can be identified, the Act provides that the government shall make claim in the Admiralty Court. The aggregate liability of the owner of the ship, or the pollutant, for each separate incident is 2,000 gold francs for each ton of ship's tonnage, with a maximum of 210 million gold francs. Where fault or negligence by the owners of the ship or the pollutant can be proved, however, the liability is unlimited.

There are many other provisions of interest in the Act but they are concerned mainly with administration or with measures to secure compliance. The Act provides, for example, for the appointment of pollution control officers with power to board any ship within the 12-mile territorial sea and Canada's exclusive fishing zones, "that he suspects on reasonable grounds is bound for a place in Canada." The officers may inspect the ship to determine whether it meets Canadian safety requirements. Ships that don't can be ordered out of Canada under threat of a \$25,000 fine. Even those who comply may be required to follow specific directions to port or through Canadian waters.

The Arctic Waters Pollution Prevention Act

Concern that economic growth should proceed within the constraints imposed by environmental factors is reflected again in the Arctic Waters Pollution Prevention Act. Introduced against a background

of the TORREY CANYON disaster off England, our own ARROW disaster off Nova Scotia, the Santa Barbara incident and the voyages of the MANHATTAN, this Act deals with pollution arising from shipping, from land-based installations and from commercial activities such as oil drilling carried out on the northern continental shelf. It provides for control or prohibition of the deposit of any substances that would degrade or alter the Arctic waters to any extent detrimental to their use by man, or by any animals, fish or plants that are useful to man. This definition of pollution, incidentally, is similar to that used in the other pieces of legislation to which I have referred.

The Act enables the Government of Canada to make regulations concerning the technical character of ships entering particular zones in the Arctic or to prevent them from doing so if they do not meet the required standards. From this point of view, the Act is similar to the amendments to the Canada Shipping Act cited above, which provide protection from pollution on the Atlantic and Pacific Coasts of Canada. It does differ, however. For example, as the Minister of Indian Affairs and Northern Development pointed out during the debate on the Second Reading of the Act, "measures required to control pollution offshore from the east and west coasts in some respects must be far more complicated since shipping routes, regulations and patterns have developed and land use and habitation have become established." In the Arctic, by contrast, we start with a slate that is clean on both sides. On the one hand there is no established pattern of commercial use and on the other there is for all practical purposes no pollution at present in Arctic waters. Not merely is it

desirable that we should keep it this way, but the delicate ecological balance of the Arctic demands that we do so. Indeed, in the House of Commons debate on this Act, the Minister of Indian Affairs and Northern Development reiterated that the primary objective of the legislation was to reconcile economic development with the protection of the delicate ecological balance of our Arctic regions:

"The effect of this new legislation would be to make clear that the Northwest Passage is to be opened for the passage of shipping of all nations subject to the necessary conditions required to protect the delicate ecological balance of the Canadian Arctic."¹⁷

Earlier, on October 24, 1969, the Prime Minister referred to the same issue when he told the House of Commons that:

"Canada regards herself as responsible to all mankind for the peculiar ecological balance that now exists so precariously in the water, ice and land areas of the Arctic Archipelago . . . We do not doubt for a moment that the rest of the world would find us at fault, and hold us liable, should we fail to ensure adequate protection of that environment from pollution or artificial deterioration. Canada will not permit this to happen . . ."¹⁸

This Act, perhaps more than any other piece of environmental legislation, demonstrates the Canadian Government's recognition of the international dimensions of the environmental problem and of the fact that traditional approaches and institutions may not be adequate. To quote from the speech of the Minister for External Affairs on the Second Reading:

"The problem of environmental preservation transcends traditional concepts of sovereignty and requires an imaginative new approach oriented toward future generations of man and the plant and animal life on which their existence and the quality of that existence will depend. The problem of environmental preservation moreover must be resolved on the basis of the objective considerations of today rather than the historical¹⁹ accidents or territorial imperatives of yesterday."

It will be recalled that this legislation was the source of a disagreement between the governments of Canada and the United States. The disagreement, I should stress, did not concern the need for special environmental controls in this area. Rather it concerned the means of achieving it and interrelated questions of the Law of the Sea. I mention it here only because it serves to underline the point that the Canadian Government not only attaches great importance to environmental protection, as do other governments, but also that it appears ready, where necessary, to question traditional concepts and methods of response, and to pioneer in the development of new concepts and responses where the old prove inadequate. In replying to the United States' protest, for example, the Canadian Government made it clear that Canada attached so much importance to the environmental dangers which exist in the Arctic that it regarded the matter as a question of self-defense. In the words of the Note,

"It is the further view of the Canadian Government that a danger to the environment of a state constitutes a threat to its security. Thus the proposed Canadian Arctic waters pollution prevention legislation constitutes a lawful extension of a limited form of jurisdiction to meet particular dangers. . . . The proposed anti-pollution legislation is based on the overriding right of self defence of coastal states to protect themselves against grave threats to their environment."²⁰

Speaking in the House of Commons on October 24, 1969, the Prime Minister stressed that Canada has been committed from the outset to a multilateral approach to the problem of Arctic marine pollution which would complement the action taken by Canada itself in this regard. It is my understanding that the Canadian Government has indicated its readiness to participate in multinational efforts to elaborate inter-

nationally agreed standards of navigation safety and pollution control in Arctic waters.

Air Quality Management

In the last Throne Speech, the government announced its intention to proceed with legislation on air pollution.²¹ Recent statements by the ministers concerned indicate that it will enable the application of a broad range of strategies to maintain and enhance the quality of our air resources. The statements also indicate that these strategies will reflect the same underlying assumptions as those described above. This is important because, otherwise, it would be quite possible for those responsible for certain activities to shift the burden of pollution from one resource to another. If, for example, water quality strategies in a region were designed to induce industry to internalize the costs of water pollution, they could fail unless the air quality strategies in the region were also designed with this purpose in mind.

I would anticipate that the air quality legislation will again demonstrate the emphasis that the Government of Canada is giving to the international dimensions of environmental pollution. There are many reasons for this. The global dispersion of air pollution is well documented and of increasing seriousness. As in the case of water, it is of special significance to Canada vis-a-vis the United States. In the water field, it has long been obvious that unco-ordinated action by either the United States or Canada will not enhance the quality of boundary waters such as the Great Lakes. The problem of air pollution is the same, but spatially on a much vaster scale. Neither country has

been blameless in the past. In the early 1930s, for example, sulphur dioxide emissions from a smelter at Trail, B.C. were damaging agriculture and forestry in the State of Washington. Unpleasant though this was, it had a satisfactory outcome. The International Joint Commission made an award of \$350,000. in damages to U.S. residents. The Trail smelter subsequently introduced the means to recover more than 90 per cent of its former atmospheric wastes as useful by-products, and a valuable precedent in joint Canada-U.S. action in regard to the environment had been set.

Given the growth trends mentioned at the beginning of this paper, future problems are likely to be much more difficult to solve. They are accentuated by the effect of meteorology, especially in eastern Canada. It is easy to show that the main zone of atmospheric convergence in eastern North America coincides for much of the year with the international border. In plain language, for much of the year, the odds are approximately even as between Canadian pollution being transported into the United States and American pollution moving into Canada. In summer, however, the bias is very much in favour of American air moving northwards. Inevitably, therefore, Canada is likely to be intimately concerned with the success of air pollution control measures in the United States and vice versa.

Let me be even more explicit. An underlying assumption of Canadian environmental strategies is that the United States will meet its obligations for both boundary air and water quality. In the case of water, these obligations are embedded in the Boundary Waters Treaty. If the United States does not meet its obligations, for example in the Great Lakes, Canadian efforts will be to no avail.

The transboundary movement of pollutants need not occur through air or water, of course. A large proportion of the pollution-intensive fuels, biocides, transportation vehicles, furnaces and other machines used in Canada are imported. They are imported in many forms, as raw materials, finished products or designs licensed for manufacture. As mentioned earlier, the federal government can, if it chooses, regulate both the quality as well as the quantity, of such imports. Other countries may do the same and several have done so. It will be obvious to this group that such measures, if generally adopted, could have significant implications for international trade and commerce. It seems clear that this type of strategy is best adopted by nations acting within the context of some form of international arrangements.

There is a real danger that development and application of environmental strategies will rapidly outpace the ability of international arrangements, laws and institutions to respond. The Canadian Government has indicated, in many different ways, its readiness to support international effort in this field. Most recently, it has welcomed the establishment of, and offered its full support to, the Environment Committee of the OECD. It is playing a major role in the work for the forthcoming United Nations Conference on the Human Environment, and in the work of the NATO Committee on the Challenges of Modern Society. The Canadian International Development Agency is endeavouring to assist developing countries in the preservation of their own natural and human environments.

Arctic Land Use Regulations

I have dealt at length with assumptions underlying emerging Canadian strategies to maintain and enhance the quality of our air and water resources. The Arctic has figured prominently in this discussion. We expect major oil discoveries and associated economic development in the north. It is only a matter of time. We must, therefore, become expert in ways to cope with the ecological and other side effects of these activities, under unique Arctic conditions. These side effects can be severe not only in the waters of the Arctic but also on the land. Here, too, the Canadian Government has responded with recent, comprehensive measures.

I refer to the Land Use Regulations shortly to be enforced by the Department of Indian Affairs and Northern Development in the Yukon and Northwest Territories. They embody principles that will govern the actions of individuals and corporations entering the area. As in the case of water and air strategies, ecological capacity is to be respected. The regulations will recognize the varying ability of the environment to withstand various forms of activity. What is permissible in the Barren Grounds of Keewatin or on the Canadian Shield, for example, would be disastrous if practised in the fragile ecosystem of the Mackenzie Delta. What may be harmless at one season of the year may lead to permanent damage if carried out at another; for example, the movement of vehicles across the terrain or the disturbance of wildlife during the breeding season. Under the regulations individuals or corporations can operate in the territories only under permit. In addition to general conditions, the department will be able to set down special conditions governing specific activities.

Such measures may sound rather restrictive. They will sound even more so if I go on to add that in administering these regulations it is the intention of the Department of Indian Affairs and Northern Development to err on the side of environmental protection. I must elaborate on this a little more, however. First, various ministers have reiterated that it is the Government's policy to encourage and to facilitate economic development in the North. The Land Use Regulations are means to regulate that development, not to prevent it. Most corporations concerned with northern development recognize the dangers of unrestrained activity in the Arctic environment. They should welcome the establishment of clearly defined and well enforced ground rules that will apply to their competitors as well as themselves. Second, by far the major part of present activity in the Arctic is exploratory in character and temporary in its occupation of a specific piece of ground. This being so, it is unnecessary and inappropriate to undertake sophisticated cost-benefit analyses designed to decide, for example, whether the chance of finding oil in a particular place is worth risking the disappearance of a rare breeding ground for a particular species of duck. For the present we protect the ducks. If at some future time, a specific proposal is made to occupy a specific limited site for a specific purpose - let us say test drilling or the development of a production well or mine - then that is the time to work out a detailed policy for the area.

Conclusion

In conclusion, I would like to refer again to the fact, noted in my opening remarks, that the Government of Canada's efforts have so

far been concentrated on the natural environment. It has been concerned with the impact of man on the environment, rather than with the broadest implications of man as part of that environment. It is doubtful that this relative emphasis can continue. If over 94 per cent of Canada's population may be living in large cities and towns by the end of the century, it seems obvious that we must devote major attention to ensuring that the man-made urban environment is as attractive as we are trying to make the natural environment. There have been constitutional problems limiting the federal government's ability to act in urban areas. These difficulties still exist, but there is also increasing pressure for the Government of Canada to act. The federal government is responding to urban problems in a number of specific ways. The most recent and potentially most important involves the appointment of a Minister of State for Housing and Urban Affairs. As in much of the legislation that I have described, the federal government is here providing for measures that depend for their success on close co-operation with provincial governments.

In the last analysis, the success of environmental strategies will be judged in terms of results. The present concern for the environment is too recent, and the problems facing us too vast, to do more than identify some of the strategies that the Government of Canada is now in a position to apply and some of the assumptions underlying those strategies. An assessment of their effectiveness must await the future. I believe, however, that the measures taken in the last few years, together with those now before Parliament, are evidence that the Government of Canada attaches the highest importance to environmental

problems. The public concern for conservation more than half a century ago unfortunately proved to be only temporary. The present concern, I believe, is permanent, and so also are likely to be the activities of the Government of Canada in this field.

FOOTNOTES

1. The author wishes to acknowledge the assistance of Dr. C.I. Jackson, Head, Economic Geography Section, Policy Research and Co-ordination Branch, in the preparation of this paper.
2. F.J. Thorpe, "Historical Perspective on the 'Resources for Tomorrow' Conference", Conference Background Papers and Proceedings, Vol. 1, Ottawa, Queen's Printer, 1961.
3. Projections from Systems Research Group, Canada: Population Projections to the Year 2000, Systems Research Group, 252 Bloor St., West, Toronto, 1970.
4. U.S. Department of Housing and Urban Development, "Trends and Projections of Future Population Growth in the United States, with Special Data on Large Urban Regions and Major Metropolitan Areas for the period 1970 - 2000. Technical Paper No. 4", p. 16; presented to the Ad Hoc Sub-Committee on Urban Growth, Committee on Banking and Currency, U.S. House of Representatives, July 22, 1969.
5. Ibid, p. 18.
6. Wolfgang M. Illing, Population, Family, Household and Labour Force Growth to 1980, Economic Council of Canada Staff Study No. 19, Ottawa, Queen's Printer, 1967, p. 78.
7. From about \$3,200 in 1967 to \$4,700 in 1980 and \$8,600 in 2000. Some projections suggest a fourfold increase to \$12,200 by 2000. See Systems Research Group, Canada: Economic Projections to the Year 2000.
8. Economic Council of Canada, Sixth Annual Review: Perspective 1975, Ottawa, Queen's Printer, 1969, p. 1.
9. J.L. Orr, Statistical Data on Industrial Research and Development in Canada, Ottawa, Queen's Printer, 1967, Table 2.
- 9a. See "Protecting Environment: Tough Job for New Minister", Ottawa Citizen, December 24, 1970. In this interview Southams (News Service) asked the Hon. J. Davis, Minister of Fisheries and Forestry and minister-elect of the new department, "Some people have suggested that an agency of the environment should have either a veto power or a charter with other government agencies that they must have its approval for major projects." The Minister replied, "Well, I think this will come, but clearly we're starting on the other foot and we shift to this."
10. Hansard, House of Commons, October 8, 1970, p. 2.
11. Hansard, House of Commons, October 1, 1970, p. 35.
12. Government Organization Act, 1966, Ottawa, Queen's Printer, 1966.

13. See, for example, the speech by the Minister of Energy, Mines and Resources in introducing the Second Reading of the Canada Water Act, Hansard, House of Commons, November 20, pp. 1046 - 1047.
14. See address by R.J. Orange, M.P., Parliamentary Secretary to Minister of Energy, Mines and Resources, to Annual Meeting of the Canadian Water Resources Association, Penticton, B.C., July 17, 1970.
- 14a. See "Protecting Environment: Tough Job for New Minister", Ottawa Citizen, December 24, 1970. Replying to a question by Southams, the Hon. J. Davis stated, "My philosophy, fundamentally, is that the industry cleans up to the maximum extent. It has as close as possible to total recycling. If it had total recycling, in theory it could go anywhere; in fact, we know that there always is some loss so that there again are optimum locations, say from a fisheries point of view. This has to be up to us. We just have to be on top of that development."
15. See An Act to Amend the Canada Shipping Act, Canada, Third Session, Twenty-eighth Parliament, 1970, Bill C-2.
16. Hansard, House of Commons, April 16, 1970, p. 5938.
17. Idem.
18. Hansard, House of Commons, October 24, 1969, p. 39.
19. Hansard, House of Commons, April 16, 1970, p. 5948.
20. From the summary in Hansard, House of Commons, April 17, 1970, p. 6027.
21. Hansard, House of Commons, October 8, 1970, p. 2, also p. 4.

